



Grouped Dwelling Development 384 Berwick Street, East Victoria Park Transport Impact Statement

Client // Hamlen Pty Ltd
Office // WA
Reference // 300303506
Date // 07/10/22

Grouped Dwelling Development

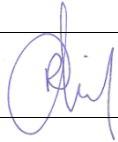
384 Berwick Street, East Victoria Park

Transport Impact Statement

Issue: Rev 9 07/10/22

Client: Hamlen Pty Ltd
Reference: 300303506
Stantec Office: WA

Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
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F	19/10/2020	Final – address new unit mix for DA	Rodney Ding			
b	20/09/22	Revised draft report deleting Carson access	RD		RD	RD
Rev 7	28/09/22	Revised Final - addressing final comments	RD		RD	RD
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Table of Contents

1. Introduction	1
1.1 Background & Proposal	1
1.2 Context	1
1.3 Purpose of this Report	1
1.4 Reference Material	2
2. Development Proposal	3
2.1 Indicative Site Layout & Land Uses	3
2.2 Site Location	3
2.3 Car Parking	3
2.4 Vehicle Access	4
2.5 Road Reserve Widths	5
2.6 Road Cross Sections & Speed Limits	5
2.7 Pedestrian Access & Facilities	6
2.8 Bicycle Access & Facilities	6
2.9 Loading Areas	6
3. Accessibility Review	8
3.1 Introduction	8
3.2 Access by Road	8
3.3 Public Transport	9
3.4 Walking and Cycling	9
3.5 Crash Statistics	10
4. Trip Generation and Traffic Impact	12
4.1 Current Traffic Flows	12
4.2 Expected Traffic Flows	12
4.3 Vehicle Types	12
4.4 Traffic Generation and Traffic Impact	12
4.5 Road Cross-Sections	13
4.6 Traffic Distribution	14
4.7 Traffic Impact of Development on Local Area	14
4.8 Intersection of Berwick Street and Crossover	16
5. Findings, Summary & Conclusions	19

Appendices

A: Development Plans

Figures

Figure 2.1: Site Location Plan 4

Tables

Table 2.1:	Development Schedule	3
Table 3.1:	Crash Record for Roads and Intersections/Road Sections in the vicinity of the Subject Site	10
Table 4.1:	Estimated Traffic Generation	13
Table 4.2:	Estimated Traffic Generation - Total	13
Table 4.3:	Estimated Traffic Generation for Current Use	13
Table 4.4:	Current & Expected Mid-Block Daily Traffic Flows	14
Table 4.5:	Austrroads Guidelines	15
Table 4.6:	Comparison to Austrroads Guidelines	15
Table 4.7:	Berwick Street Crossover – Expected Operation in AM Peak in 10 years after Completion	16
Table 4.8:	Berwick Street Crossover – Expected Operation in PM Peak in 10 years after Completion	16

1. Introduction

1.1 Background & Proposal

Stantec (previously legacy GTA Consultants) has been engaged by *Hamlen Pty Ltd* to prepare a Transport Impact Statement (TIS) for the redevelopment of the site at 384 Berwick Street in East Victoria Park. This report is to support a submission on behalf of the client for a proposed amended local development plan for the site.

This report follows the guided methodology of a TIS, prepared in line with the Western Australian Planning Commission publication '*Transport Assessment Guidelines for Development, August 2016*' (WAPC Guidelines). It also considers the Town of Victoria Park's (ToVP) planning policies and the key elements of the site's integration with the existing transport networks and the potential traffic impact of the proposed redevelopment.

1.2 Context

The redevelopment site is at the south eastern extremity of East Victoria Park, situated within the ToVP and approximately 8.1km south-east of the Perth CBD by road (6.4km in a direct line). The proposed redevelopment is within the well-established suburb of East Victoria Park and so benefits from already being well connected to nearby vehicular, walking, cycling and public transport networks.

WAPC Guidelines provide direction on the level of assessment which is necessary to be carried out with respect to the likely traffic impact of a development proposal. Typically, any development which is expected to have a 'moderate' traffic impact, that is, generating less than 100 trips in the peak hour is satisfied by a TIS. Any development which is expected to generate in excess of 100 trips in the peak hour requires a Transport Impact Assessment (TIA) to be undertaken. Both types of assessment consider the operation and layout of the site, but they differ in their assessment of external traffic impact.

In the context of this redevelopment and its land use proposal, it is expected that less than 100 trips generated in a given peak hour if applying 'typical' traffic generation rates (which represent locations outside of non-major activity corridors). In this case a TIS is appropriate.

1.3 Purpose of this Report

This TIS briefly outlines the transport aspects surrounding the proposed redevelopment. The intent of a TIS, as per the WAPC Guidelines, is to provide the approving authority with sufficient transport information to confirm that the Applicant has adequately considered the transport aspects of the development and that it would not have an adverse transport impact on the surrounding area. Of particular relevance is the accessibility of the development by non-car modes, in accordance with Government's sustainable development objectives, and its integration with the surrounding area.

In accordance with the WAPC Guidelines, this TIS outlines:

- redevelopment proposals
- current vehicle access arrangements and existing traffic conditions proximate to the site
- the traffic generating characteristics of the proposed redevelopment and to any low volume residential roads

- particular intersections or sections of road that may be adversely affected
- the potential for rat-running, especially through existing residential areas
- developments operating outside normal business hours in/near residential areas
- information on the pedestrian, bicycle and public transport access arrangements to the site
- suitability of the proposed parking provision within the site
- any issues associated with the heavy vehicles generated by the development
- the anticipated impact of the proposed redevelopment on the surrounding road network.

1.4 Reference Material

In preparing this report, reference has been made to the following:

- Proposed amended local development plans
- Liveable Neighbourhoods Guidelines
- Residential Design Codes
- WAPC Transport Assessment Guidelines for Development
- traffic surveys undertaken by Stantec (then GTA Consultants) as referenced in the context of this report
- other documents as nominated.

2. Development Proposal

2.1 Indicative Site Layout & Land Uses

The proposed redevelopment plans have been previously provided in earlier versions of this report, as prepared by the project planner, *Rowe Group*. The proposed site access and car parking layouts are discussed in the following sections.

The proposal includes the provision of residential lots to allow a mix of 52 townhouses, as summarised in Table 2.1. There is no commercial component for this proposed development. There is proposed to be 127 on-site parking bays to be provided as part of the development.

The current site has the National Archives of Australia on the 11,029sqm block located near the centre of the site.

Table 2.1: Development Schedule

Use	Size
Grouped Dwellings	52
Grouped Dwelling Parking Bays	77 on-lot for residents
Multiple Dwelling Parking Bays	34 on-lot for residents
Visitor Bays	16 on-site for visitors

2.2 Site Location

The subject site is located at 384 (Lot 3) Berwick Street in the suburb of East Victoria Park in the Town of Victoria Park. The site is located on the south-east corner of the Baillie Avenue/Carson Street road and approximately 100m west of the intersection of Berwick Street and Hill View Terrace. The site has two street frontages, Berwick Street to the south/west and to Baillie Avenue/Carson Street to the north via a 5m wide, 20m long portion of the lot.

There is a special needs primary school to the north/west of the site, open space to the north/east and bushland to the south/east of the site. Beyond these the development is typically residential.

The site is located approximately 800m to the East Victoria Park retain hub bordered by Hill View Terrace, Albany Highway and Shepperton Road.

The subject site and its environs are shown in Figure 2.1. on the following page.

2.3 Car Parking

It is proposed to provide each lot with single or double garages, depending on the size of the lot frontage, plus there is proposed to be on-site parking provided within the internal private roadway in the form of embayed parking for 16 cars for visitors. Residential parking is to be provided by individual garages on each lot or a grouped car park for the multiple dwelling site.

The present site has parking provision for 34 cars to park on-site.

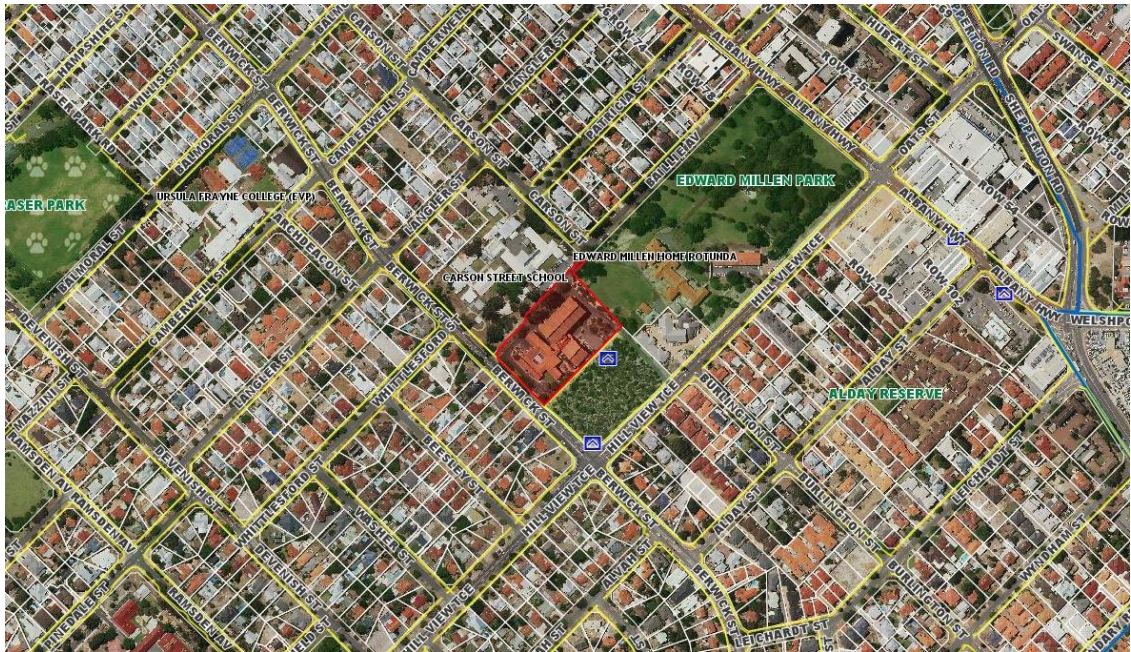
Being a purely residential development no parking for persons with a disability (PWD) is proposed.

There is presently parking permitted on Baillie Avenue/Carson Street but not feasible on Berwick Street.

Under the Residential Design Code and being within 250m of a high frequency bus route on Berwick Street, the site should provide a minimum of 71 parking bays for residents plus 16 for visitors, a total of 87 bays.

With the provision for a total of 127 car parking proposed, the site is in surplus by 40 parking bays on-site and thus there is a low possibility of local street being used to park on by residents or visitors.

Figure 2.1: Site Location Plan



(Map / Image Reproduced Courtesy of Intramaps)

2.4 Vehicle Access

The previous vehicular access to the site prior to the development of this site was via:

- Direct from Berwick Street via a 7.2m crossover located at the western corner of the site (to be retained as part of the development)
- Hill View Terrace via a 5.8m wide roadway across the adjacent bushland site (to be removed as part of the development).

The proposed development includes the retention of the 7.2m wide crossover on Berwick Street in its present location and format (concrete) as a full movement crossover with no access via the Baillie Avenue/Carson Street crossover.

Primary access to and from the site via the street network is expected direct via Berwick Street.

Baillie Avenue and Carson Street are Access Roads under the Main Roads WA functional road hierarchy, whilst Berwick Street is a Distributor A road under the functional road hierarchy.

Sight distance for the proposed crossover on Berwick Street meets the requirements of AS/NZS 2890.1:2004 *Parking facilities Part 1: Off-street car parking*. For a development of this nature, a sight distance of 65m absolute minimum and 85m desirable minimum should be provided in a 60km/h zone. This minimum can be achieved with a sight distance of approximately 90-95m available to/from the southern approach along Berwick Street on approach from the Hill View Terrace traffic signals. This sight distance is considered appropriate. The approach from the south is a downgrade of approximately 4-5% and this will add approximately 5m to the required

absolute minimum sight distance of 65m to bring that to 70m. Based on this downgrade, the available 90-95m sight distance exceeds the minimum requirements and thus acceptable.

The proximity of the current and proposed crossover/driveway to the merge area of northbound traffic was also assessed. Traffic travelling north along Berwick Street are required to merge from two lanes to one. The maximum lateral shift required is the same for the right lane to merge left or the left lane to merge right, this a distance of approximately 1.75m. Based on a 60km/h speed and a lateral rate of shift of 0.6m/s a merge distance of approximately 45-50m is required. The end of this merge area, measured from the "Form One Lane", sign is approximately 20-25m from the current/proposed crossover/driveway. This is considered ample room to accommodate the expected single car stopped on the painted median of Berwick Street waiting to enter the crossover/driveway of the proposed development. Cars travelling north would have completed their merge well before passing a car stopped to enter the crossover/driveway.

As detailed in Section 3.5 there has been only 2 recorded crashes on the section of Berwick Street between Whittlesford Street and the southern boundary of the subject site in the past five years.

2.5 Road Reserve Widths

Road reserve widths within the scheme amendment area are proposed to be typically 12m, with one 6m laneway and a short section of road reserve approximately 10m wide. Apart from the 10m wide reserve all other reserves meet the "deemed to comply" conditions of the Residential Design Codes. The 10m wide reserve will still allow the retention of a 7.0m wide road pavement and will thus not impact of vehicular movement. The 6m wide laneway can allow the inclusion of street lighting with the adoption of small truncations at the rear of lots backing onto the laneway to allow the inclusion of 2-3 streetlights.

2.6 Road Cross Sections & Speed Limits

The speed limit through the site is proposed to be the general built up area limit of 50km/h, but given the short length of straight road sections, the actual speeds are expected to be significantly less than this at approximately 20-30km/h. This is a great design outcome which appeals to the vulnerable road user. The general road cross section proposed for the 12m wide roads are:

- 6m wide roadway
- 2.3m parallel parking
- 1.5m footpath
- 1.2m landscaping

The Northern and southern roadways are to be two-way, whilst the western roadway is to be one-way from Berwick Street, whilst the eastern roadway is to be one-way towards Berwick Street.

The 6m wide laneway will allow two-way traffic flow. There will be a central roadway of 3.6m with flush paved areas either side of this. This flush paved area will allow for the placement on bins on bin collection day and allow the movement of waste collection vehicles to travel both ways along the laneway and collect bins placed either side of the laneway. When bins are not placed in the laneway, the 6m width will allow a more traditional two-lane, two-way laneway traffic flow.

2.7 Pedestrian Access & Facilities

Access to the site is presently via an existing footpath network along all roads adjoining the site as summarised below:

- Berwick Street - Both sides of the road connecting to the wider footpath network
- Baillie Avenue/Carson Street - north side of Baillie Avenue and south side of Carson Street connecting to the wider footpath network.

The existing network generally has pram ramps and gaps in the islands at median crossings for refuge and therefore considered friendly for all road user types.

The proposed development does not propose any new pedestrian facilities externally but does propose an internal footpath network on the internal roadways.

There is proposed to be direct pedestrian access to the development from Berwick Street and Baillie Avenue/Carson Street. The Baillie Avenue/Carson Street access will be via the 5m wide section of the site and based on engineering assessments, with the location of a proposed transformer, there should be enough space to accommodate this pedestrian access.

2.8 Bicycle Access & Facilities

No specific provision is to be made for cycling parking for the grouped dwellings within the development, except the provision of storerooms for each site which will allow the storage of bicycles. The multiple dwelling site proposes 16 on-site bike racks which will allow 18 bikes to be secured within the parking area. Based on the proposed 32 dwelling the multiple dwelling site should have 16 spaces for residents and 4 for visitors. Each dwelling will have its own store and these are typically sized to allow for a bike to be stored within it if required and thus the proposed 16 racks (allowing 18 bikes to be secured) and store room capacity for a further 32 bikes, more than meets the required 20 total spaces required.

The roads surrounding the site are typically low volume (in the case of Baillie Avenue/Carson Street) and relatively wide, as such, friendly for on-road cycling. There is a sealed painted shoulder which was observed and can be used as a pseudo on-road cycle lane both north of the site on Berwick Street and Hill View Terrace to the south of the site. The site is within 100m of the SE26 Perth Bike Network route connecting the Causeway to Canning Vale.

The multiple dwelling site is required to provide parking for 3 motorcycles, either for visitors or tenants, but no specific parking bays have been provided. In relation to the motorcycle parking shortfall, there is a large surplus of resident parking for the grouped dwellings and the overall site is in surplus by 1 visitor parking bay. This would likely make several of the visitor car bays available for visitor motorcycle parking

2.9 Loading Areas

Loading for the proposed development is proposed to occur to and from the proposed internal roadways with vehicles parked within the embayed parking areas (or the use of driveways for private loading).

Rubbish bins are proposed to be collected by the council rubbish collection from the road verges of the internal road network either outside respective lots or at bin pads on the loop road for laneway lots to move their bins to on the rubbish collection day.

The internal roads have been checked for both the council rubbish collection which might occur on a weekly basis and for larger furniture delivery trucks which will utilise the internal roads less

frequently. Vehicles of 9.5m and 12.5m length will be able to negotiate the internal road layout to enter and exit the site from Berwick Street in forward gear.

TOWN OF VICTORIA PARK
Received: 20/10/2022

3. Accessibility Review

3.1 Introduction

This chapter outlines the outcome of a baseline accessibility assessment that was undertaken to establish the transport provision serving the site and its surrounds. It also recognises that walking and cycling are encouraged modes of transport and are also secondary modes of travel for public transport users.

3.2 Access by Road

The development site abuts two 'Access Roads', as classified in the Main Roads WA (MRWA) Functional Road Hierarchy and one 'District Distributor A' road. Due to the site's good connection to the external road network with access to be solely via Berwick Street, rat-running through low volume residential roads is avoided.

3.2.1 Local Roads

Access Roads bordering the development site are all of a single carriageway standard, providing one lane for travel in each direction. These Access Roads provide direct driveway access to residential properties with a general urban speed limit of 50km/h (except before and after school where a 40km/h limit applies) and a capacity of up to 3,000 vehicles a day (indicative) although a lower traffic volume would be more realistic. These roads include:

- Baillie Avenue (north of site)
- Carson Street (north of site).

The following traffic volumes on these roads were obtained from the ToVP Intramaps site:

- Baillie Avenue ~320 vehicles per day (vpd)
- Carson Street ~350 vpd.

In general, the road environment with proposed overhanging trees with embayed on-street parking and short street lengths will provide a traffic calmed road environment not conducive to speeds greater than the current 50km/h urban speed limit and most likely significantly less than this.

3.2.2 Arterial Roads

Berwick Street

Berwick Street runs in an east-west direction connecting Hill View Terrace in the south to Canning Highway in the north and has a posted speed limit of 60km/hr. It is classified as a District Distributor A road according to the MRWA Functional Road, and it is configured as a two-lane dual-carriageway with on-road cycle lane carrying around 15,000 vehicles per day near the subject site. Traffic on Berwick Street has shown a slight growth rate of approximately 1.1% compounding per annum in recent years. Berwick Street provides direct access to the Canning Highway to the north/west of site.

Vehicles traveling to/from the site will only use Berwick Street to access the site.

3.2.3 Key Intersections

There are three nearby intersections which may be affected by the proposed development. These are discussed below.

Berwick Street/Langler Street

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Received: 20/10/2022

These two streets intersect as a four-way Stop Sign controlled intersection. The sight distances on all approaches and at all stop lines were considered appropriate and acceptable for the road environment and abutting land-uses/property boundaries. Berwick Street is the priority road with right turn pockets of approximately 45-50m in length in a paint/concrete median. Langler Street is Stop Sign controlled on both legs. The median in Berwick Street is wide enough to allow passenger cars to pause in the median to wait in when turning right from Langler Street (i.e. a two-stage turn).

Berwick Street/Hill View Terrace

This intersection is a four-way traffic signal-controlled intersection. The Hill View Terrace approaches each have turn pockets of approximately 50m in length. The western approach of Hill View Terrace has a left turn lane of approximately 50m length. The Berwick Street north approach has a right and left turn pocket each of approximately 65m length. Right turns are prohibited on the Berwick Street southern approach. The signal phasing provides leading right turns from the Berwick Street north and Hill View Terrace east approaches. Both Hill View Terrace approaches have a painted bike lane provided through the intersection.

3.3 Public Transport

It is considered that access to the site via public transport is applicable to all users including residents and visitors. The nearest bus stops are conveniently located within a short walking distance for both directions of travel to and from Perth. As such the site is very conducive to public transport usage.

The site is located approximately 100m (approximately a 1-minute walk) from bus stops (11770 for to Perth and 11755 for ex Perth) located on Berwick Street either side of Whittlesford Street.

In peak periods the bus services running to and from Perth (170, 176, 177 and 179) run every 10 minutes approximately, making these stops on these routes, high-frequency.

3.4 Walking and Cycling

As with public transport, the site is located in an area where the walking and cycling infrastructure is well established. It is considered that both walking and cycling will be attractive modes of transport for all users – residents and visitors to/from the site.

On-site bicycle parking will not be explicitly provided for, but there are storerooms provided for each lot, which will allow the storage of bicycles to encourage the use of this mode of travel.

Under the Residential Design Codes 16 bays/racks should be provided for residents to park their bikes for the multiple dwelling site, whilst 4 bays/racks should be provided for visitors. It is assumed that the resident component will be provided within the storerooms or within on-site racks as stated above and thus allow for up to 50 bikes to be stored for the multiple dwelling site.

The site is well connected to the existing cycling network in the nearby vicinity. Baillie Avenue and Carson Street are classified as “good road riding environments” whilst Berwick Street has on-road bike lanes west of the site, which connect to the SE16 Perth Bike Network route at Kent Street. Hill View Terrace has on-road bike lanes and the SE26 Perth Bike Network between Causeway and Canning Vale. Considering the proposed development type, the location of the site is well placed to take advantage of local amenities and transport services through well-connected walking and cycling routes.

The proposed development is approximately 500m from nearby primary schools and 800m from cafes and other shops.

Notwithstanding the above, any further application for development will review and revise the design to ensure it complies with the provision of the necessary walking and bicycle parking.

3.5 Crash Statistics

MRWA Crash Analysis Reporting System (CARS) provides detailed crash data and covers all intersections and midblock sections which have had one or more reported road crashes over a 5-year period from 2017 to 2021. It provides detailed crash data for Berwick Street, Carson Street, Baillie Avenue and nearby intersections over that period.

These crashes are reviewed in more detail in Table 3.1 below.

Table 3.1: Crash Record for Roads and Intersections/Road Sections in the vicinity of the Subject Site

Location	State Ranking		Crash Severity				Total Crashes
	Cost	Frequency	PDO	Medical	Hospital	Fatal	
Baillie Ave /Albany Hwy	-	-	0	0	0	0	0
Carson St /Patricia St	-	-	0	0	0	0	0
Carson St /Langler St	-	-	0	0	0	0	0
Berwick St /Langler St	4116	3581	1	1	1	0	3
Berwick St /Hill View Tce	228	352	32	4	3	0	39
Baillie Ave	N/A ^[1]		1	0	0	0	1
Carson St	N/A ^[1]		0	0	0	0	0
Langler St	N/A ^[2]		0	0	0	0	0
Berwick St	N/A ^[2]		0	1	1	0	2

PDO – property damage only, Medical – roadside medical assistance, Hospital – hospitalisation required

[1] State ranking not considered appropriate for a local access road due to relatively low traffic volumes.

[2] State ranking not considered appropriate for a local access road due to relatively low traffic volumes.

The above summary crashes are discussed below in more detail.

- Berwick Street/Langler Street:

The three crashes which was recorded at this intersection were a hospital, casualty and property damage right-angle crashes which all occurred at night. This may indicate an issue with the current street lighting not illuminating the intersection or approaches sufficiently, to provide good night-time visibility.

- Berwick Street/Hill View Terrace:

Of the 39 recorded crashes 7 were rear end, 3 right-angle and 29 right-turn-through. Of these crashes 5 occurred in the wet, 19 at night and 7 resulted in a casualty. All of these crashes were found to be at a rate higher than expected for an intersection of this type. The rate of casualty crashes at this intersection is approximately 1.86 casualty crashes per 10 million vehicles entering (10M VE) the intersection. This is less than a network average of approximately 2.0 casualty crashes per 10M VE for signalised four-way intersections.

- Berwick Street (from eastern boundary of site and Whittlesford Street):

The crashes which occurred on Berwick Street involved a vehicle reversing from a driveway on the southern side of Berwick Street and the other crash involved a single motorcycle losing control and crashing with a pillion passenger. The rate of crashes on this section of Berwick Street is approximately 1.57 crashes per Million-Vehicle km, which is fairly typical of a divided arterial road in a built-up area and further indicates no safety issues. Vehicles exiting the proposed development will be in forward gear, thus the likelihood of a crash being low compared to a vehicle reversing as was the case in one of these crashes.

The traffic volumes generated by the development during peak hours and over the course of a day are considered to be low at approximately 25-35 vehicles in any one hour. This traffic is expected to be all via the Berwick Street access and is further dispersed over a number of turning movements.

A development of this type and in this location could not be expected to materially alter the existing frequency and severity of road crashes in the area. Further, the low increase in traffic volumes could not be expected to adversely affect pedestrians crossing roads, or any cyclists that travel on-road.

Accordingly, the road safety characteristics of the proposed development are considered acceptable.

4. Trip Generation and Traffic Impact

4.1 Current Traffic Flows

Traffic volumes on the adjacent road network of Carson Street, Baillie Avenue, Langler Street and Berwick Street were assessed based on the current traffic counts sourced from the Town of Victoria Park Intranet website and MRWA website.

Berwick Street:	15,170 vpd with 3.1% heavy vehicles (2021/22) AM Peak: 715 vph northbound, 550 vph southbound PM Peak: 605 vph northbound, 660 vph southbound
Langler Street:	estimated at 500 vpd AM Peak: 50 vph PM Peak: 50 vph
Baillie Avenue:	estimated at 320 vpd AM Peak: 32 vph PM Peak: 32 vph
Carson Street:	estimated at 350 vpd AM Peak: 35 vph PM Peak: 35 vph

4.2 Expected Traffic Flows

With the surrounding residential development having reached maturity, the current traffic volumes are expected to remain relatively unchanged into the near future on the local street network of Langler Street, Carson Street and Baillie Avenue. According to the most recent data, traffic flows on Berwick Street have been increasing at a rate of approximately 1.1% per annum, but for the purposes of this assessment it has been assumed that traffic would grow at close to double this historic rate at 2% per annum over the next 10 years.

4.3 Vehicle Types

The types of vehicles accessing the site will be mostly private motor vehicles. No traffic to and from the site is expected to be truck type traffic, except for furniture delivery vans/smaller trucks parking on the embayed street parking (or on driveways) and the council rubbish collections.

4.4 Traffic Generation and Traffic Impact

In order to estimate the trip generation associated with the proposed development, reference has been made to trip rates within the *WAPC Guidelines* (which often refer to the *RTA Guidelines, NSW*) and the *Trip Generation 9th edition, 2012 - Institute of Transportation Engineers (ITE)*, Washington, USA. These trip rates are considered to accommodate the general vehicle activity at the site incorporating:

- Residents
- Visitors to residents
- Servicing / deliveries.

Table 4.1: Estimated Traffic Generation

Land Use	Peak Hour Rates (vph)	Generation Estimates (vpd/vph) (using Daily/AM/PM peak)
Grouped Dwelling	6.5 trips per day	340/25/35

Residential unit rate is based on both the RTA Guidelines recorded peak hour rate and Stantec's Database for grouped dwellings near good public transport provision.

Table 4.2: Estimated Traffic Generation - Total

Trip type	Trips IN	Trips OUT
Daily	170	170
AM Vehicle	6	19
PM Vehicle	23	12

Assumed Residential in/out split is 25%/75% in the AM peak & 67%/33% in the PM peak as per WAPC Guidelines. 7.5% of the daily flows in the AM peak and 10% in the PM peak.

Based on the above, the total traffic generation of the development site is expected to be approximately 340 vehicular trips in a day with approximately 25 occurring in the AM peak and 35 vehicle movements in a typical PM peak hour.

It should be noted that the above 340 vehicular trips per day will not be all additional traffic as the site is was previously used by the National Archives of Australian.

Traffic counts were not undertaken for the current use. However, based on the approximate floor areas of the buildings previously on the site, the previous use (or a similar approved use) on the site would give rise to the following traffic generation as shown in Table 4.3. The previous use is a combination of office space and warehousing for the archives on the site.

- Office Use 1,500m² GFA
- Warehousing Use 2,000m² GFA.

Table 4.3: Estimated Traffic Generation for Current Use

Land Use	Daily Rates (vpd)	Daily Trip Generation Estimates (vpd)
Office Use	10-20 trips per 100m ² GFA	150 to 300
Warehousing Use	4 trips per 100m ² GFA	80
Total		230 to 380

Thus, the previous use of the site would have very similar traffic generation rates as compared to the current proposed Development yield. There would be little to discern between the traffic generated by the site over a typical day.

4.5 Road Cross-Sections

All the above traffic flows are appropriate for the proposed road cross sections as discussed previously. The general 6.0m wide pavement streets throughout the estate can cater for daily flows up to 1,000 vpd. With embayed parking bays these roads can cater for traffic flows up to 3,000 vpd. The 6.0m wide main entry road will be able to cater for traffic flows up to 3,000 vpd.

Traffic flows on the laneway lots for the higher density lots are expected to have traffic flows of approximately 100 to 150 vpd. Laneways of 6.0m width can cater for traffic flows of up to 300 vpd.

Based on the calculated traffic volumes expected for the estate, the proposed road cross sections discussed previously are considered appropriate.

4.6 Traffic Distribution

The traffic generated by the proposed development will be distributed onto the adjacent road network via the Berwick Street crossover driveway as this is now proposed to be the sole access for the development. The development is expected to be the homes to professionals whose place of employment would most likely be in the Perth CBD. Berwick Street provided the most convenient and efficient route to and from the Perth CBD and is expected to be utilised the most to and from that direction.

Examining traffic flow patterns on Albany Highway and Berwick Street, the following patterns were found:

- Approximately 62% of the peak hour traffic flows head north in the AM peak
- Approximately 62% of the northbound traffic is on Berwick Street

Based on these considerations the expected traffic distributions are as follows:

- Berwick Street 100% or approximately 340vpd

Further, this traffic would be distributed onto the adjacent road network with the majority of traffic travelling to and from the north and remainder, the south, again distributed:

- To/from north 67% or approximately 227vpd
- To/from south 33% or approximately 113vpd

4.7 Traffic Impact of Development on Local Area

All roads near the proposed site are expected to have traffic volumes typically significantly less than the maximum traffic flows for similar roads of their type, the exception is Berwick Street, where traffic growth on the road network not related to the proposed development is expected to increase traffic flows on Berwick Street to levels slightly above the typical maximum traffic flow a road of this type should carry. The mid-block comparisons to maximum flows that these roads should carry are shown in Table 4.4 below.

Table 4.4: Current & Expected Mid-Block Daily Traffic Flows

Road	Indicative Maximum Daily Flow (two-way vpd)	Current Daily Flow (two-way vpd)	Expected Daily Flow in 10 years after completion (two-way vpd)	Expected Daily Flow in 10 years with Dev (two-way vpd)	Expected change in Daily Flow in 10 years with Dev
Baillie Avenue	3,000	320	320	320	+0%
Carson Street	3,000	350	350	350	+0%
Patricia Street	3,000	380	380	380	+0%
Langler Street	3,000	510	510	510	+0%
Berwick Street (N)	15,000	15,170	17,860	18,085	+1.3%
Berwick Street (S)	15,000	15,170	17,860	17,975	+0.6%

There is not expected to be any significant adverse impacts in the traffic flows to and from the site with the new development (no traffic flows are proposed onto Carson Street and/or Baillie Avenue).

With regards to the intersections, Table 2.4 from the Austroads publication, *Guide to Traffic Management Part 6 – Intersections, Interchanges and Crossings* provides advice as to intersection and crossover performance in peak flow conditions about possible further analysis. This is summarised in Table 4.5. If the calculated expected traffic flows for this development exceed those shown in Table 4.5 further assessment is typically required.

Table 4.5: Austroads Guidelines

Major Road Type	Major Road Flow (two-way, vph)	Minor Road Flow (two-way, vph)
Two-lane	400	250
	500	200
	650	100
Four-lane	1,000	100
	1,500	50
	2,000	25

Examining the “worst case” scenarios of all development traffic flows utilising the Berwick Street access traffic for the proposed development, Table 4.6 is derived.

Table 4.6: Comparison to Austroads Guidelines

Intersection	Major Road Flow (two-way, vph)	Minor Road Flow (two-way, vph)
Berwick St/Crossover	1,290	35

From the above it can be seen that the Berwick Street access is expected to have traffic volumes significantly less than shown in Table 4.5. Thus, there is no need for the crossover nor most of the intersections to be examined in further detail using such analysis software like SIDRA Intersection (SIDRA). Under these flow conditions, the crossover and intersection are expected to operate at a Level of Service A with Low Degree of Saturation for critical movements, minimal delays and short vehicle queues. However, for thoroughness, these were assessed in more detail in the following sections.

4.8 Intersection of Berwick Street and Crossover

This crossover was modelled as an intersection with Berwick Street the priority road and the crossover the terminating road. To allow a robust assessment, it was assumed that all development traffic would use this access.

The expected operation of the crossover was assessed using SIDRA Intersection and a the mid-block traffic counts recorded on Berwick Street obtained from MRWA in the AM and PM peak periods.

The critical results are shown on the following pages for the AM (8am to 9am) and PM (4pm to 5pm) periods in Table 4.7 and Table 4.8.

Table 4.7: Berwick Street Crossover – Expected Operation in AM Peak in 10 years after Completion

Critical Turning Movements					
Approach	Mvt.	Short Lane Length	DOS	Average Delay (sec)	95th Percentile Queue (m)
Berwick St SE	RT	12m (effective length on painted median)	0.003	9s	0.1m (0-1 cars)
Crossover NE	RT	-	0.07	17s	1.6m (0-1 cars)
Intersection			0.48	0.2s	

DOS – Degree of Saturation, # - Intersection DOS¹

Table 4.8: Berwick Street Crossover – Expected Operation in PM Peak in 10 years after Completion

Critical Turning Movements					
Approach	Mvt.	Short Lane Length	DOS	Average Delay (sec)	95th Percentile Queue (m)
Berwick St SE	RT	12m (effective length on painted median)	0.01	10s	0.3m (0-1 cars)
Crossover NE	RT	-	0.05	18s	1.1m (0-1 cars)
Intersection			0.46	0.3s	

Overall, the Berwick Street crossover is expected to operate satisfactorily in both the AM and PM peaks. There are expected to be minimal delays and queues either on Berwick Street entering the crossover or on the crossover turning into Berwick Street.

This access point is proposed to be located at the current crossover location for the site. This crossover provided access to the previous National Archives Australia site, where it could have had very similar traffic flows as compared to the current proposed use.

The expected traffic flows to and from this crossover are likely to be mostly to and from the north/west (67%) with the south/west approach being significantly less favoured (33%). The expected traffic flows per hour turning right from Berwick Street into the crossover are expected to be approximately 2-3 vehicles per hour in the AM peak (when traffic flows northbound on Berwick Street are the highest approximately 760vph) and 7-8 vehicles per hour in the PM peak (when traffic flows are lower at approximately 575vph). During the day

¹ SIDRA INTERSECTION adopts the following criteria for Level of Service assessment:

Level of Service		Intersection Degree of Saturation (DOS)		
		Unsignalised Intersection	Signalised Intersection	Roundabout
A	Excellent	<=0.60	<=0.60	<=0.60
B	Very Good	0.60-0.70	0.60-0.70	0.60-0.70
C	Good	0.70-0.80	0.70-0.90	0.70-0.85
D	Acceptable	0.80-0.90	0.90-0.95	0.85-0.95
E	Poor	0.90-1.00	0.95-1.00	0.95-1.00
F	Very Poor	>=1.0	>=1.0	>=1.0

the right turn volume is expected to be approximately 1-2 vehicles with northbound traffic flows in the order of 400 to 420vph. It is further noted that approximately 400vph of this traffic in the AM peak is traffic travelling from Berwick Street south/east or Hillview Terrace and thus the only traffic required to merge after crossing Hillview Terrace they would be traffic travelling side by side in adjacent lanes. Other traffic travelling north/west along Berwick Street would be turning as single lanes from Hillview Terrace and thus not required to merge.

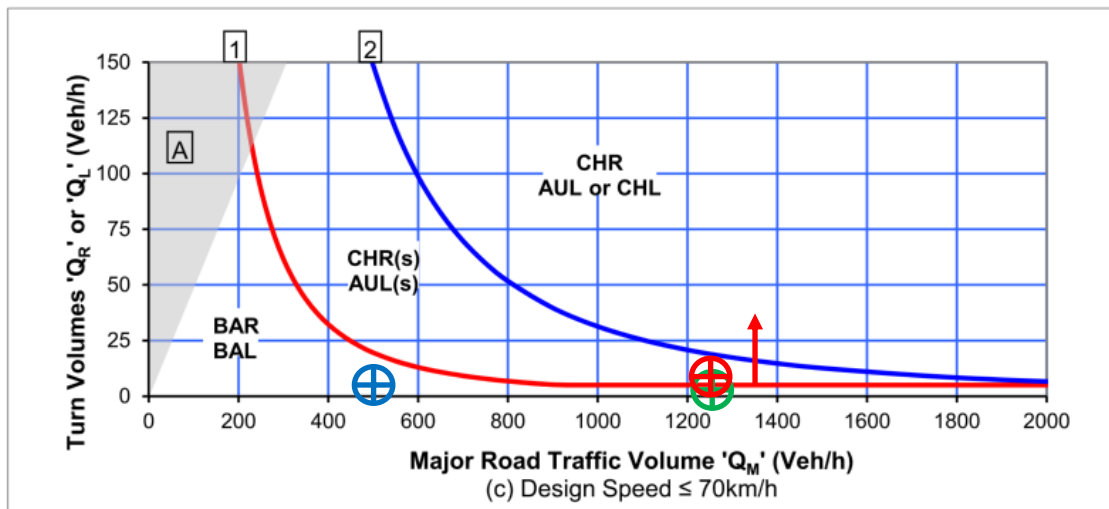
The design of the Berwick Street median provides an overall width of approximately 7.2m from the southern kerb to the edge line nearest the southbound lane on Berwick Street. The median in this area is approximately 3.0 to 3.2m which is wide enough to allow a car to pull off the northbound carriageway and store to wait to turn right into the site. This will not impede nor interfere with traffic merging on Berwick Street travelling north. As noted in Section 2.4, the end of the merge from two lanes to a single lane for northbound traffic is approximately 20-25m prior to the crossover, and this is ample space to accommodate a single car expected to stop when waiting to turn right into the crossover/driveway.

As noted, this right turn volume into the site is very low in the busiest peak period (AM) and thus exposure is considered low when traffic flows heading north on Berwick Street are at their highest and there may be merging in this area for this northbound traffic.

In terms of the requirement for the installation of a right turn pocket, this has been assessed using the warrants for right turn treatments as per Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management. This provides a guide as to whether these treatments are required in "greenfield" situations. Bear in mind what we have here is a "brownfield" situation but nonetheless it has been used as the graph gives a guide.

The traffic flows described above have been plotted based on Figure 3.25 from this guideline for a <70km/h design speed. These show the corresponding plot points for the AM peak (green), PM peak (red) and during the day (blue).

Figure 4.1: Warrants for turn treatments



What the above plot indicates that in this instance a BAR (or Basic Right turn) treatment is all that is required, and based on the current median geometry, this has been achieved in this instance. It is noted the PM flows fall slightly into the channelised treatment category (CHR(s)), but it should be noted that the intent of this graph is a guide for "greenfield" situations and what we have is a "brownfield" situation. What this "brownfield" situation does is increase costs of a CHR(s) in comparison to a "greenfield" situation and in effect would push

the red line further away from the axis (in the direction of the red arrow) and thus dropping the PM flows below the shifted red line, into the BAR treatment category.

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Received: 20/10/2022

It is finally noted that in the five year period up to the end of 2021 there have been no recorded crashes involving merging vehicles on this northbound section of Berwick Street leading up to the crossover.

Based on the above assessment the level of risk for the proposed access has been assessed as LOW. To summarise this LOW risk was assessed due to:

- Low traffic flows turning right into the crossover from Berwick Street
- No merge crashes recorded on the approach to the crossover from the south
- The merge area ends prior to the position of a vehicle might be stopped waiting to turn into the crossover/driveway
- Assessment of the right turn volumes versus through traffic flows on Berwick Street does not give rise to the requirement of a treatment other than a BAR, which is presently provided.

5. Findings, Summary & Conclusions

TOWN OF VICTORIA PARK

Received: 20/10/2022

5

As a result of the traffic analysis undertaken for the proposed residential development at 384 Berwick Street in East Victoria Park:

- i The development should generate in the order of 340 vehicular trips per day with approximately 25 of these in the AM peak and 35 in the PM peak.
- ii All of this traffic will access the site via Berwick.
- iii Expected traffic flows for the development is estimated to be very similar to the traffic flows to/from a use which could have occurred on the previous zoning on the current site over a typical day.
- iv The parking area layout is suitable with an appropriate number of parking bays provided for the demographic use of the development.
- v Sight distances at the proposed Berwick Street crossover are acceptable for all vehicle turn movements, with minimal delays expected.
- vi There is a proposed internal pedestrian network on all streets which will connect to external footpaths on Berwick Street.
- vii Internal streets will be bike friendly with bike parking expected to be provided internally for each dwelling.
- viii The site is well placed to take advantage of bus routes located on Berwick Street within a 2-minute walk of the site.
- ix The overall site has a surplus of parking required with 41 surplus parking bays provided. There is a surplus of one visitor parking bay.
- x Rubbish trucks used by the Town of Victoria Park will be able to collect rubbish from the internal streets at bin pad locations and street verges.
- xi The impacts of the traffic volumes associated with the development on the road network are considered acceptable now and in the future.
- xii There is no requirement for any of the road network to be modified as a result of this development.

Appendix A

Development Plans

While all care has been taken in the compilation of this document, Rowe Group disclaims any responsibility for any errors or omissions. This document is and remains the property of Rowe Group and may not be reproduced or transmitted, in whole or in part, without the written consent of Rowe Group. All areas and dimensions are subject to survey.

PROVISIONS

Unless otherwise defined on this Local Development Plan, all development shall be in accordance with the *Town of Victoria Park Town Planning Scheme No. 1*, the *East Victoria Park Precinct Plan 12* and the *Residential Design Codes of WA* (the 'R-Codes').

All lot areas and dimensions depicted in the Local Development Plan are consistent with the survey strata and freehold subdivision approvals Western Australian Planning Commission ('WAPC') Ref. 285-20 and 159500.

General

- The Requirements of the R-Codes (Volume 1 or 2 as applicable) apply to the development, unless varied by the Town's Local Planning Policy No. 25 - Streetscape or this Local Development Plan.
- Variations to the requirements of this Local Development Plan may be approved by the Town of Victoria Park at its discretion.
- Where there is an inconsistency between the requirements of this Local Development Plan and another planning instrument, the provisions of this Local Development Plan prevail.

Dwelling Orientation

- Dwellings are to suitably address all street frontages and areas of public open space through the use of high quality architectural design features.

Setbacks

- The following minimum setbacks for the ground and first floors apply to the boundaries of each common accessway:

Lots	Minimum Setback to Accessway (m)					
	A	B	C	D	E	F
1 - 8	0.5	-	0.5	-	-	-
9	-	1.0	1.0	-	-	nil
10 - 19	0.5	-	-	nil	-	nil
20 - 30	-	2.0	nil	nil	nil	-
31 - 40	2.0	-	nil	nil	nil	-

Note: the above setbacks are not applicable to lot boundary truncations.

- For Lots 1 - 8, a minimum ground and first floor setback of 3 metres to the Berwick Street boundary applies.
- For Lots 10 - 19, a minimum ground floor setback of 3 metres to the Edward Millen Reserve boundary applies.
- A 2.5m setback to the Hill View Bushland boundary applies.
- A nil side setback to the accessways for Lots 20, 30, 31 and 40 will be considered, provided windows and horizontal and/or vertical articulation is incorporated.
- Nil side setbacks are permitted to all other side boundaries behind the street setback line, for no maximum height or length of the boundary.

Building Height

- Dwellings are to be constructed to a minimum roof height of two (2) storeys, measured to a minimum of 5.4 meters to the top of external wall at the street setback line.
- Maximum building heights are applicable to all lots as per the table below:

Top of external wall (roof above)	11m
Top of external wall (concealed roof)	12m
Top of pitched roof	14m

- Where a pitched roof, such as a hipped or gable end roof, is proposed at Lots 1 - 8, a minimum roof pitch of 25 degrees applies.

Fencing

- Uniform fencing is to be constructed by the developer along the boundaries of all lots abutting public open space (i.e. Edward Millen Park and Hill View bushland), but may be of a different type to each boundary.
- Where visually permeable fencing is provided abutting public open space (i.e. Edward Millen Park and Hill View bushland), the fencing shall be maintained as visually permeable by landowners.

Pedestrian Access

- Pedestrian access to all lots which do not directly abut Berwick Street is to be provided from the accessways.
- Direct pedestrian access is to be provided from Berwick Street to Lots 1 - 9.

This Local Development Plan has been approved by the Town of Victoria Park under Schedule 2, Clause 52 of *Planning and Development (Local Planning Schemes) Regulations 2015*.

 Manager Development Services
 Town of Victoria Park

 Date



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8862_LDP010_20221003 East vic park (Local Development Plan) - DRAWN: W. CLEMENTS - DATE CREATED: 2022.10.03 - PROJECTION: MGA50 GD494 - CADASTE: LANDGATE

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